

What is claimed is:

- 1    1.    An information processing apparatus comprising:  
2            first and second computer elements which execute the same  
3    instructions substantially simultaneously in substantial  
4    synchronism, and which have first and second memory elements,  
5    respectively;  
6            a monitor element which finds which of said computer elements  
7    is out of said synchronism;  
8            a copy element which copies a part of the data stored in  
9    said second memory element to said first memory element when  
10   said monitor element finds that said first computer element is  
11   out of said synchronism; and  
12            a third memory element which stores information to designate  
13   which part of the data stored in said second memory element is  
14   copied by said copy element when said monitor element finds that  
15   said first computer element is out of said synchronism.
- 1    2.    The information processing apparatus as claimed in claim  
2    1, wherein said copy element is activated unless a permanent  
3    failure occurred in said first computer element
- 1    3.    The information processing apparatus as claimed in claim  
2    1, wherein said monitor element finds that said first computer  
3    element is out of said synchronism based on the time in which  
4    it receives first signals from all of said computer modules.

1 4. The information processing apparatus as claimed in claim  
2 1, wherein said monitor element finds that said first computer  
3 element is out of said synchronism based on the time, commands  
4 and addresses of requests from all of said computer modules.

1 5. The information processing apparatus as claimed in claim  
2 1, wherein said information includes an address or addresses  
3 relating to said first and second memory element.

1 6. The information processing apparatus as claimed in claim  
2 1, wherein said information includes an address or addresses  
3 of access requests since said monitoring element finds said first  
4 computer elements is out of said synchronism.

1 7. The information processing apparatus as claimed in claim  
2 1, wherein said information includes information relates to data  
3 of said computer element being out of said synchronism and has  
4 possibility to differ from the corresponding data of said  
5 computer element being in said synchronism.

1 8. The information processing apparatus as claimed in claim  
2 1, wherein said information includes an address or addresses  
3 which is directed by the access request in which said first  
4 computer element being out of said synchronism is detected and  
5 by the write access request or the write access requests  
6 afterwards by said second computer elements.

1 9. The information processing apparatus as claimed in claim  
2 1, wherein said information includes an address or addresses  
3 when contents of a cache is written to said memory element.

1 10. The information processing apparatus as claimed in claim  
2 1, wherein said information indicates the location in said first  
3 memory which has possibility of inconsistency with said second  
4 memory.

1 11. The information processing apparatus as claimed in claim  
2 1, wherein said copy element copies said part of the data by  
3 utilizing a direct memory transmission.

1 12. An information processing apparatus comprising:  
2 first and second computer elements which execute the same  
3 instructions substantially simultaneously in substantial  
4 synchronism, which have first and second memory elements,  
5 respectively, and each of which has at least one processor and  
6 a bus connected to said processor;  
7 a monitor element which is connected to said bus and which  
8 finds which of said computer elements is out of said synchronism;  
9 a copy element which copies a part of the data stored in  
10 said second memory element to said first memory element when  
11 said monitor element finds that said first computer element is  
12 out of said synchronism; and

13        a third memory element which stores information to designate  
14        which part of the data stored in said second computer element  
15        is copied by said copy element when said monitor element finds  
16        that said first computer element is out of said synchronism.

1        13. The information processing apparatus as claimed in claim  
2        1, wherein said copy element is activated unless a permanent  
3        failure occurred in said first computer element

1        14. The information processing apparatus as claimed in claim  
2        1, wherein said monitor element finds that said first computer  
3        element is out of said synchronism based on the time in which  
4        it receives first signals from all of said computer modules.

1        15. The information processing apparatus as claimed in claim  
2        1, wherein said monitor element finds that said first computer  
3        element is out of said synchronism based on the time, commands  
4        and addresses of requests from all of said computer modules.

1        16. The information processing apparatus as claimed in claim  
2        1, wherein said information includes an address or addresses  
3        relating to said first and second memory element.

1        17. The information processing apparatus as claimed in claim  
2        1, wherein said information includes an address or addresses  
3        of access requests since said monitoring element finds said first  
4        computer elements is out of said synchronism.

1 18. The information processing apparatus as claimed in claim  
2 1, wherein said information includes information relates to data  
3 of said computer element being out of said synchronism and has  
4 possibility to differ from the corresponding data of said  
5 computer element being in said synchronism.

1 19. The information processing apparatus as claimed in claim  
2 1, wherein said information includes an address or addresses  
3 which is directed by the access request in which said first  
4 computer element being out of said synchronism is detected and  
5 by the write access request or the write access requests  
6 afterwards by said second computer elements.

1 20. The information processing apparatus as claimed in claim  
2 1, wherein said information includes an address or addresses  
3 when contents of a cache is written to said memory element.

1 21. The information processing apparatus as claimed in claim  
2 1, wherein said information indicates the location in said first  
3 memory which has possibility of inconsistency with said second  
4 memory.

1 22. The information processing apparatus as claimed in claim  
2 1, wherein said copy element copies said part of the data by  
3 utilizing a direct memory transmission.